

Briefing Paper
Biotech MCAN J-15-0034 and J-15-0035

PART I: BACKGROUND DATA

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A. CBI Claims: Submitter Identity, Chemical identity, Use, Recipient microorganism, Donor microorganism, Genetic construct, Exposure, Production volume, Process information.

B. Submitter: [REDACTED]

C. **Chemical Identity:** *Saccharomyces cerevisiae* [REDACTED] (J-15-0034),
Saccharomyces cerevisiae [REDACTED] (J-15-0035),

Recipient Microorganism: *Saccharomyces cerevisiae* [REDACTED]

Genetic modifications:

[REDACTED]

[REDACTED]

D. Production volume

i) Maximum PV [REDACTED]

E. Use: [REDACTED]

PART II: Introduction

The Agency has received a Microbial Commercial Activity Notice (MCAN) submission from [REDACTED] for two intergeneric strains of a yeast referred to by the company as *Saccharomyces cerevisiae*. Initially, there was a question as to whether the recipient strain, [REDACTED], is actually *S. cerevisiae* or a closely related strain, *S. boulardii*. A

search of the literature revealed that *S. boulardii* is considered to be a variety of *S. cerevisiae*, so it is referred to as *S. cerevisiae* var. *boulardii*. Although the two species are indistinguishable based on 28S rRNA (ribosomal RNA) and fatty methyl ester (FAME) analyses, they differ in some phenotypic properties. Thus, this risk assessment will consider the potential human health and ecological effects of both typical *Saccharomyces cerevisiae* strains and *S. cerevisiae* var. *boulardii* strains.

The intergeneric strains, [REDACTED] were genetically modified to enable [REDACTED]

[REDACTED] The modified strains are to be used for ethanol production [REDACTED]

PART III: Recommendation and Rationale

Drop from further review.

There is low risk associated with the manufacture and use of the production strains *S. cerevisiae* (or *S. cerevisiae* var. *boulardii*) strains [REDACTED] as the genetic modifications do not pose human health or ecological concerns and there are low exposures to workers and the general population and the environment.

PART IV: Risk Summary

A. Human Health Hazard

The recipient strain, [REDACTED], for the two MCAN submissions is either *S. cerevisiae* or *S. cerevisiae* var. *boulardii*. *S. cerevisiae* is a microorganism with an extensive history of safe use in baking, wine-making, and biotechnology. Based on a risk assessment performed by the USEPA, *S. cerevisiae* does not produce human toxins, is nonpathogenic, and has a history of safe use. *S. cerevisiae* var. *boulardii* is also a nonpathogenic yeast, and has been widely used in Europe to treat bacterial infections (McCullough et al., 1998).

The concern for pathogenicity/toxicity arising from the introduced genetic material is also low (Ward, 2015). The genes inserted into [REDACTED] [REDACTED] [REDACTED] not make this yeast pathogenic.

The final product does not contain antibiotic resistance genes. Therefore, there is low concern for antibiotic resistance genes spreading in the environment.

B. Ecological Hazards

There are low ecological hazard concerns for the recipient microorganism, *S. cerevisiae* [REDACTED]. As previously mentioned, *S. cerevisiae* is a yeast with a long history of safe use in bread baking and brewing industries. It has served as a model organism for studies in genetics and molecular biology. It is ubiquitous in the environment with no known adverse effects. In nature it is usually found in sugar-rich environments such as the surfaces of fruits or in plant exudates.

The genetic modifications done to the recipient microorganism, [REDACTED], to arrive at the production strains [REDACTED] do not pose ecological hazards.

The production strains may be expected to survive in the environment if inadvertently released from ethanol production facilities. However, the potential survival of these strains does not cause concerns. There are no antibiotic resistance genes in these strains. There inserted genes are common in many organisms in the environment. There are low hazards associated with the production strains [REDACTED] even if they were to survive if inadvertently released.